

**Pedigree Practice Worksheet**  
Ms. Ottolini, PreAP Biology

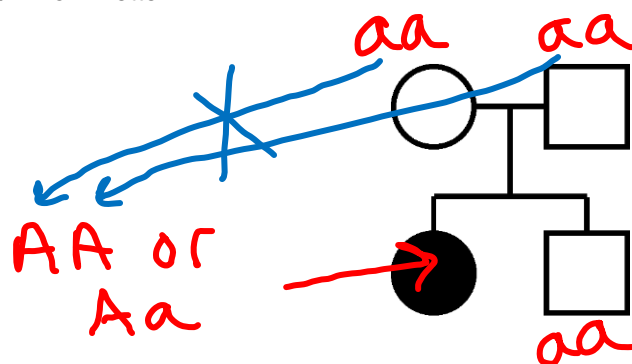
**Autosomal Dominant**

1. The pedigree below is for a genetic disease or abnormality. We do not yet know if it is dominant or recessive. We will determine if it is possible that the trait is autosomal dominant. If the trait is dominant, we could use the following symbols for the alleles:

**A = the trait (a genetic disease or abnormality, dominant)**

**a = normal (recessive)**

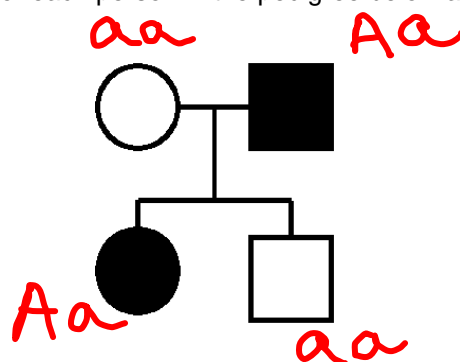
a) Assume for the moment that the trait is dominant (we don't know yet). The pedigree shows that three of the individuals have the recessive (normal) phenotype and one individual has the dominant (abnormal) phenotype. Write the genotype of the affected (abnormal) individual next to her symbol in the pedigree below. If you only know one of the genes (letters), use a "?" for the unknown letter.



No, b/c the parents would be " $aa$ " and unable to have a child

b) Is it possible that the pedigree above is for an autosomal dominant trait?

c) Write the genotypes next to the symbol for each person in the pedigree below assuming that it is for a dominant trait.



with  $AA$  or  $Aa$

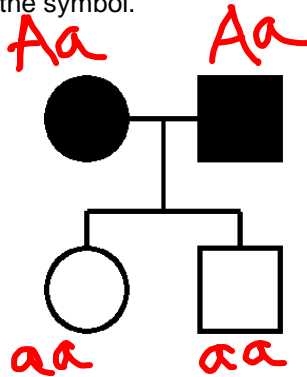
d) Is it possible that this pedigree is for an autosomal dominant trait?

Yes

e) What can you conclude from these two examples about the parents of a child that has a dominant characteristic?

At least one parent must display the trait to have a child that displays the trait

f) Write the genotype of each individual next to the symbol.



g) Is it possible that this pedigree is for an autosomal dominant trait?

Yes

h) In conclusion, can two individuals that have an autosomal dominant trait have unaffected children?

Yes, if they are both heterozygous ( $Aa$ )

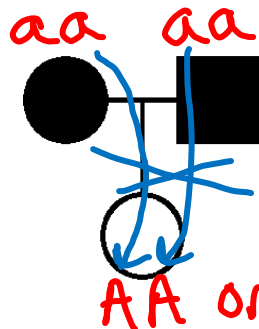
### Autosomal Recessive

2. We will determine if the pedigree below can be for a trait that is autosomal recessive. If the trait is autosomal recessive, we can use the following symbols for the alleles:

**A** = normal

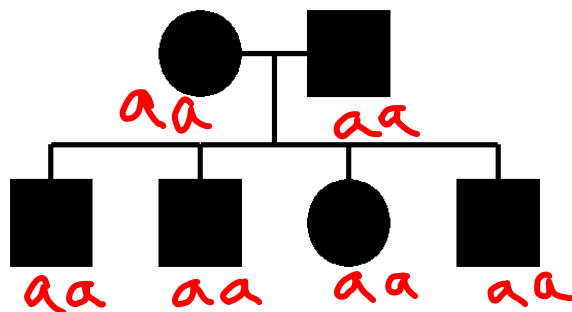
**a** = the trait (a genetic disease or abnormality)

a) Assuming that the trait is recessive, write the genotype of each individual next to the symbol.



b) Is it possible that the pedigree above is for an autosomal recessive trait?

c) Assuming that the pedigree below is for a recessive trait, write the genotype next to the symbol for each person.



d) Is it possible that this pedigree is for an autosomal recessive trait?

Yes

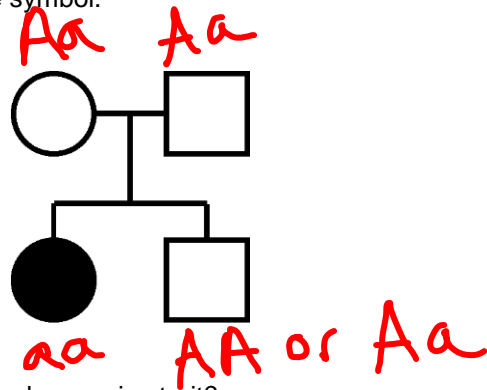
e) If a trait is autosomal recessive, what can you conclude about the children if both parents are affected?

They must all show the trait

No, b/c both parents would be " $aa$ " and unable to have a

child with " $AA$ " or " $Aa$ "

f) Write the genotype of each individual next to the symbol.



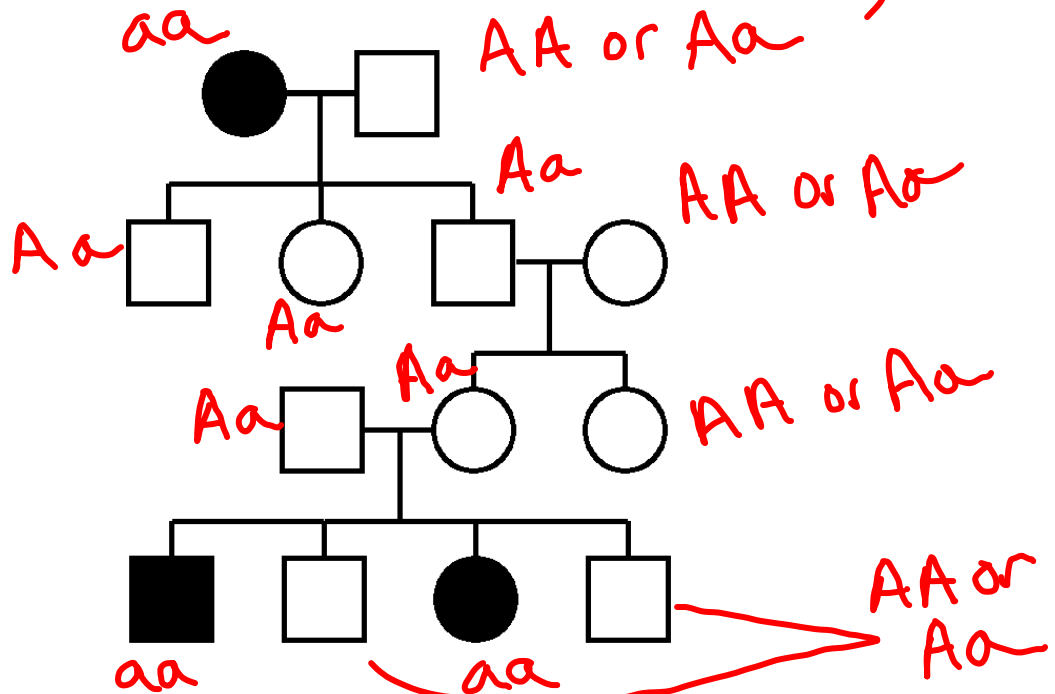
g) Is it possible that this pedigree is for an autosomal recessive trait?

Yes

h) If a trait is autosomal recessive, how can two parents who do not have a trait have a child who does?

If they are heterozygous ( $Aa$ )

i) Write the genotype of each individual next to the symbol.



j) Is it possible that this pedigree is for an autosomal recessive trait?

Yes

k) In this pedigree, two generations have been skipped. What can you conclude about recessive traits skipping generations (is it possible or not)?

It IS possible for recessive traits to skip generations

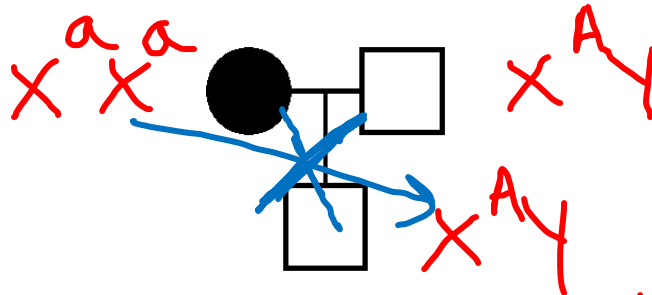
### X-Linked Recessive

3. We will determine if the pedigrees below can be X-linked recessive. Remember, females have two copies of the X chromosome and males only have one. Therefore, a male must only receive one copy of a recessive gene on the X chromosome to show that trait, whereas females must receive two copies. If the trait is X-linked recessive, we can use the following symbols for the alleles.

$X^A$  = normal

$X^a$  = the trait (a genetic disease or abnormality)

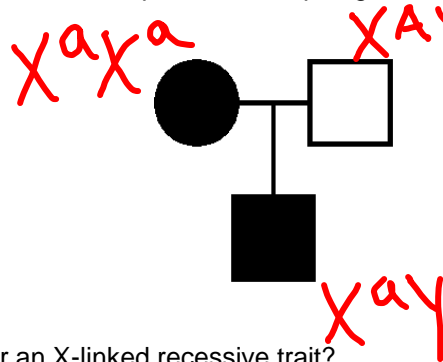
a) Write the genotype of each individual next to the symbol. (Remember, females have two X chromosomes, and males have one X and one Y chromosome.)



b) Is it possible that the pedigree above is for an X-linked recessive trait?

No because the son could not have received an  $X^A$  from his mom

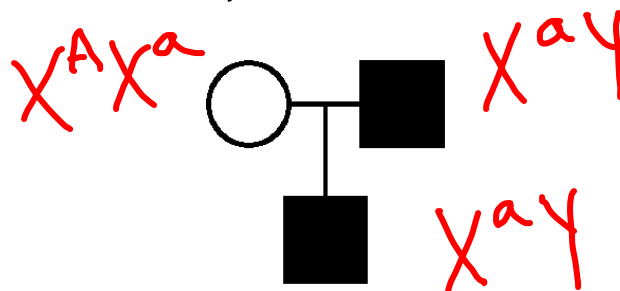
c) Write the genotype next to the symbol for each person in the pedigree below.



d) Is it possible that this pedigree is for an X-linked recessive trait?

Yes

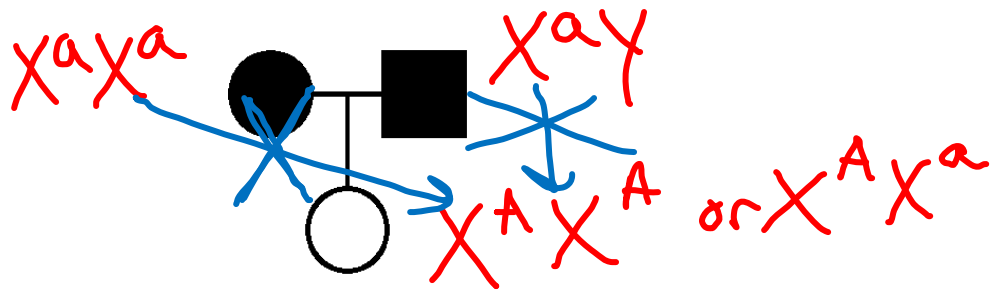
e) Write the genotype of each individual next to the symbol.



f) Is it possible that this pedigree is for an X-linked recessive trait?

Yes

g) Write the genotype of each individual next to the symbol.

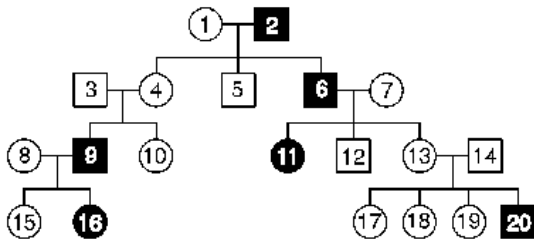


h) Is it possible that this pedigree is for an X-linked recessive trait?

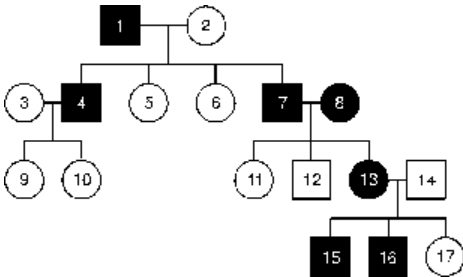
**No**

### Using What We've Learned About Pedigrees

Pedigree A



Pedigree B



For Questions 4 through 9... Answer with either "yes" or "no." If you answer no, explain why.

4. Can pedigree A be autosomal dominant? To answer this question, go back and look #1 a + b.

**No**

5. Can pedigree B be autosomal dominant?

**Yes**

6. Can pedigree A be autosomal recessive?

**Yes**

7. Can pedigree B be autosomal recessive?

**No**

8. Can pedigree A be X-linked recessive?

**Yes**

9. Can pedigree B be X-linked recessive?

**Yes**